

California Water Quality Control Board
Santa Ana Region

March 4, 2005

Item: 22

Subject: Newport Bay/San Diego Creek Watershed Toxics TMDLs/Proposed Regional Monitoring Program (RMP) Status Report

Pursuant to the requirements of Section 303(d) of the Clean Water Act, in the late 1980's and early 1990's, the Regional Board listed Newport Bay and San Diego Creek as impaired due, in part, to violations or threatened violations of the narrative objectives for toxic substances specified in the Basin Plan. The Basin Plan specifies two narrative toxic substances water quality objectives (WQOs) to protect beneficial uses: 1) toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health; and 2), the concentration of toxic substances in the water column, sediment or biota shall not adversely affect beneficial uses. Placement of the Bay and the Creek on the 303(d) list necessitates the development of Total Maximum Daily Loads (TMDLs) to address inputs of problem pollutants so as to correct the impairment.

The 303(d) listings were based on data provided by the State Mussel Watch (SMW) and Toxics Substances Monitoring Program (TSMP) that showed the relatively high bioaccumulation of lead, DDT, PCB's and other toxic substances in mussel and fish tissue. SMW and TSMP data have been used to identify the need for additional focused monitoring in apparent problem areas. The data are not generally sufficient to support fish or shellfish consumption advisories to protect public health, or to reach definitive conclusions regarding the impacts of toxic substances on aquatic or other biota in Newport Bay or San Diego Creek. For this reason, in placing the Bay and Creek on the 303(d) list, the Board did not identify the specific toxic pollutants that needed to be addressed through the development and implementation of TMDLs.

In May 2000, the US Environmental Protection Agency (USEPA) promulgated the California Toxics Rule (CTR), which establishes numeric water quality objectives for 126 toxic substances. These objectives apply to California estuarine, bay, and inland surface waters, including Newport Bay and San Diego Creek. These numeric objectives, as well as sediment guidelines, provide another basis for comparison of Newport Bay and San Diego Creek conditions to assess impairment.

In 2000, Board staff prepared the report Final Problem Statement for the Total Maximum Daily Loads For Toxic Substances in Newport Bay and San Diego Creek (December 15, 2000), which evaluated the SMW and TSMP data and additional data collected through special studies and waste discharge requirement monitoring programs in the watershed. The report identified the specific pollutants for which TMDLs were found necessary by Board staff. Work was also initiated to develop a TMDL for one of the identified pollutants, selenium.

Pursuant to a consent decree, the USEPA conducted an independent review of the available data and identified those toxic pollutants that in their judgement warranted TMDL development. The USEPA TMDL pollutant list differed somewhat from that identified by Board staff in the Final Problem Statement. USEPA identified fourteen pollutants, including metals and organic compounds that required TMDLs.

Both the USEPA and Board staff found that TMDLs for selenium need to be developed for San Diego Creek and Newport Bay. As noted above, Board staff began drafting the selenium TMDL in 2000, and work on a TMDL for diazinon and chlorpyrifos was initiated in 2001. Reports prepared by Board staff were used by the USEPA in developing technical TMDLs for these pollutants, which were promulgated on June 14, 2002. At that time, the USEPA also promulgated technical TMDLs for the other pollutants for which TMDLs had been found necessary. Technical TMDLs include the basic components of numeric targets, wasteload and load

allocations, etc., but do not include implementation plans since those plans are the responsibility of the State. USEPA and Board staff coordinated closely in the development of these technical TMDLs.

Since that time, a substantial amount of work has been initiated or completed to address the toxic TMDL needs for Newport Bay and San Diego Creek. The approach being used by Board staff is to review the data and analyses used by USEPA in their technical TMDL process, together with additional data that has been obtained subsequently, to assess whether changes to the technical TMDLs are necessary and appropriate. Staff is also developing recommended implementation plans, which include the steps that must be taken by the Regional Board and parties responsible for inputs of TMDL pollutants to control those inputs to (1) meet the TMDLs, (2) monitor the efficacy of control measures, and (3) address areas of uncertainty. Board staff then prepare recommended Basin Plan amendments to incorporate the TMDLs, with implementation plans, into the Basin Plan.

To date, implementation of this approach has resulted in the approval of a Basin Plan amendment to incorporate a TMDL for diazinon and chlorpyrifos in the Newport Bay watershed. The Regional Board approved this amendment in April 2003 and requisite approvals by the State Water Resources Control Board, Office of Administrative Law and the USEPA were obtained on October 15, 2003, January 5, 2004 and February 13, 2004, respectively. This TMDL is now being implemented.

The table below indicates the expected timeframes for Regional Board consideration of Basin Plan amendments to incorporate the remaining toxics TMDLs, with revisions to those promulgated by USEPA as necessary and appropriate, as well as relevant implementation plans into the Basin Plan.

Proposed Date of Regional Board Consideration of Basin Plan Amendments

TMDL	Date
Organochlorine Compounds	February 2006
Rhine Channel	May 2006
Metals	June 2006
Selenium	July 2007

The USEPA toxics TMDL promulgation document includes a number of implementation recommendations intended to assist in implementing the TMDLs. USEPA explicitly recognized that there is substantial uncertainty concerning the sources of the TMDL toxic pollutants, as well as the relationship between pollutant loads and environmental effects in the San Diego Creek/Newport Bay watershed. Little biological data are available to determine the magnitude and nature of the effects of the TMDL toxic substances on the biota. Accordingly, USEPA recommended a phased TMDL approach, which involves the collection and analysis of additional data to improve understanding of pollutant sources and effects, periodic review of the TMDLs, including implementation plans, in light of the additional data, and revision of the TMDLs if and as necessary.

All the TMDLs that the Regional Board has considered to date¹ employ this phased approach, and Board staff expects that the future recommended toxic TMDLs will do so as well. The phased approach is necessary in light of the limited data currently available upon which to base TMDL and implementation decisions. Board staff is now engaged with other agencies and parties in an extensive program of investigations designed to

¹ The Regional Board and other responsible agencies (State Water Resources Control Board, Office of Administrative Law and USEPA) have approved TMDLs for nutrients, sediment, fecal coliform bacteria and diazinon/chlorpyrifos in the San Diego Creek/Newport Bay watershed. The Regional Board recently approved nutrient TMDLs for Canyon Lake and Lake Elsinore; these TMDLs are being forwarded for other requisite approvals. Draft nutrient TMDLs for Big Bear Lake and its tributaries and pathogen TMDLs for specific waterbodies in the Middle Santa Ana River watershed have been presented at Regional Board workshops.

address data deficiencies and to allow revision/refinement of the technical TMDLs, where necessary, to assure that implementation plans are meaningful, effective and fair. The following paragraphs provide a concise summary of these investigations.

Organochlorine Compounds TMDL

The organochlorine compounds for which USEPA developed technical TMDLs include total PCBs and the legacy pesticides dieldrin, chlordane, toxaphene, and DDT. The organochlorine compounds (OCs), as a class of toxic pollutants, all exhibit long-term ecological effects directly related to their ability to resist degradation and to persist in the environment because of their tendency to associate with sediments or other solids and to accumulate in animal tissue. The USEPA OCs technical TMDL established numeric water column, sediment, and fish tissue targets for San Diego Creek and Newport Bay. USEPA used NOAA sediment quality guidelines as the primary numeric target. These targets were selected from the NOAA Sediment Screening Quick Reference Tables, which address the protection of benthic organisms, as well as bioaccumulation into higher trophic level animal species.

Although it is recognized that the current source of OCs in the SDC/NW watershed is mainly from eroding soils, USEPA had very limited data upon which to quantify the loading of those sources. The source analysis in the technical TMDL was primarily a qualitative assessment, based on literature review, an understanding of the chemical properties of OCs, and current sediment monitoring data. The technical TMDL back-calculated the pollutant loading capacities and the existing loads. For SDC, the load analysis used sediment load estimates and pollutant- and fish species-specific bioconcentration factors (BCFs). The Newport Bay (NB) loads were estimated using modeled sedimentation deposition rates and patterns, the sediment pollutant targets, and in-bay OC sediment concentrations. The loading capacity for each individual OC was determined by comparing the existing load to the calculated load. The waste load allocations (WLAs) and load allocations (LAs) were based on the more stringent load.

The USEPA TMDL identified a number of areas of uncertainty concerning the sources and loads of the OC pollutants. USEPA did not identify any terrestrial hotspots for the OCs, particularly PCBs, but they recommended that potential locations of PCB spills be investigated. As described above, the lack of sufficient sediment monitoring data required USEPA to utilize back-calculations in several TMDL components. They recommended that the San Diego Creek/Newport Bay sediment TMDL monitoring program include OCs such that relationships between sediment and contaminant loads can be better understood.

The organochlorine compounds TMDL and Implementation Plan (IP) that Board staff is developing will update the USEPA technical TMDL. Pollutant data collected since June 2002 and new data generated by several planned or ongoing studies should provide a more realistic estimate of the OCs loading capacities in the watershed, leading to more appropriate WLAs and LAs. Additional sediment load data are available through the Orange County sediment monitoring program. In order to meet schedule commitments for Regional Board consideration of the OCs TMDL Basin Plan amendment, it is unlikely that SDC/NB watershed site-specific bioaccumulation factors will be developed. They will be considered in context of a phased Implementation Plan approach. The calculation of organochlorine bioaccumulation factors requires detailed specific information, such as site and species data, local contaminant concentrations and hotspots, contaminant inputs and pathways, and food web linkages. Board staff has initiated some studies, identified in the next section, to collect some of the scientific data needed to establish the linkages between sediment concentrations, accumulated amounts in lower trophic levels and the transference through the food chain. A study is being conducted to understand the transfer of organochlorine compounds, selenium and trace metals in Newport Bay fish. Board staff will evaluate whether the Canadian Environmental Quality Guidelines are applicable to determining the appropriate bioaccumulation factors for Newport species.

SCCWRP studied the concentrations of OCs in recreational and forage fish collected in Newport Bay, and the final report was received in July 2004. The study determined that although DDT and PCB concentrations in fish and sediment declined, these substances are still accumulating in fish in Newport Bay. The screening values established by the Office of Environmental Health Hazard Assessment (OEHHA) for human

consumption of fish contaminated by OC pollutants continued to be exceeded, and the tissue of several fish species in the watershed continue to show accumulated concentrations of DDT and PCBs exceeding human and wildlife consumption screening values. The number of Newport fish tissue analyzed for contamination was insufficient for an OEHHA response, such as a fish advisory, but OEHHA recently conducted a contaminant trend assessment program throughout Southern California to evaluate contaminant levels in fish caught recreationally. OEHHA may issue a fish advisory in Newport as a result of their conclusions.

Board staff will propose a phased implementation plan (IP) for the OCs TMDL due to the complexity of source identification and controls in the watershed, and the need to identify any human or wildlife impacts. The overall goal of the organochlorine TMDL implementation plan (IP) will be to identify control measures to reduce the toxicity of sediments in the watershed and the pollutant concentrations found in fish tissue. Staff is evaluating other regional boards' organochlorine TMDLs for other appropriate OCs numeric targets, and the USEPA national bioaccumulation factors. The ongoing studies, supported by grant and TMDL funding, are expected to enable staff to recommend revisions to the USEPA technical TMDL and to develop an appropriate and effective implementation plan.

Board staff established an OC Technical Review Committee to provide technical input into the design of scientific investigations into the sources and effects of OCs in the watershed. The Committee has provided peer review of data and reports generated by the studies supporting the OCs TMDL development. The Regional Board has also received federal grant funding through a CWA Section 106 grant to obtain Tetra Tech assistance in identifying appropriate wildlife targets for DDT, chlordane, dieldrin, and PCBs. Staff expects that Tetra Tech will recommend which of these guidelines are most appropriate for the SDC/NB watershed. Another task under the 106 grant is to determine the human health consumption risk using EPA's assessment procedures, standard default fish consumption (intake) rates, exposure frequency, and site-specific OC tissue values.

Rhine Channel TMDL

The Rhine Channel is a small drainage (~2.5 acres) in Lower Newport Bay that receives limited tidal flushing. Most of the runoff is from the surrounding industrial and commercial land uses. Water quality and sediment data collected for several decades indicate impairment as the result of copper (Cu), chromium (Cr), lead (Pb), mercury (Hg), selenium (Se), and zinc (Zn), and the organochlorine compounds chlordane, dieldrin, DDT (total), and PCBs (total). Contamination in the Rhine Channel sediments reflects inputs from various industrial operations in the vicinity, including shipyard operations, canneries and metals plating. Industrial activity in the vicinity of the Channel began at least by the early 1920's and continues today (boatyard operations). In December 1997, the Regional Board designated the Rhine Channel through the Bay Protection and Toxics Cleanup Program as a toxic hot spot for metals and organics. The designation required that the Regional Board develop a toxic hot spot preliminary cleanup and action plan. Board staff developed the cleanup plan in 1997. The plan identified a preliminary set of remediation options, including either placement of clean sediment (cap) over the contaminated sediments or their removal. However, information on the depth and spatial extent of the contaminated sediments was still required to assess the technical and economic feasibility of the alternatives.

USEPA evaluated the unique environmental conditions in the Rhine Channel and promulgated a technical TMDL specifically for the Channel that addresses all the pollutants identified as the causes of impairment therein. USEPA affirmed the Board's prior findings that the contaminated sediments were the primary source of the impairments, and based the TMDL wasteload allocations (WLAs), load allocations (LAs), and numeric water column and sediment targets on water quality and sediment data. The TMDL established fish tissue targets for chromium, mercury, and organochlorine compounds. In 2002, Board staff contracted with the Southern California Coastal Water Research Project (SCCWRP) to investigate the spatial extent of toxicity and contamination in the Rhine Channel. SCCWRP sampled throughout the Rhine and characterized the surface sediment concentrations in several locations. The SCCWRP study confirmed the Board's toxic hot spot locations, but also showed that some concentrations had declined over time. Approximately 70% of the load allocation for mercury and chromium was attributed to existing in-channel sediments. The study

recognized that SCCWRP had determined key locations of sediment contamination throughout the Rhine based on surface sampling, but the full depth of contamination should be characterized.

In 2003, Board staff initiated the technical report to support a proposed TMDL implementation plan for remediation. Staff contracted the Orange County Coastkeeper (OCCCK) to provide the data necessary to characterize the full magnitude of the areal extent, depth, and severity of contamination throughout the sediment layer. OCCCK recently completed the investigation, and is developing an engineering report and operating plan. The report is expected to be a realistic evaluation, including costs, of remediation options to improve the sediments to an unpolluted level. Board staff is evaluating the USEPA sediment numeric targets for the Rhine Channel, and the additional data from the OCCCK study will help establish their appropriateness as cleanup standards. Also, Board staff will consider if agencies such as the California Department of Toxic Substances Control, the US Army Corps of Engineers (USACOE), or USEPA should be involved in the remediation or perhaps even become the lead agency for cleanup operations.

In the SCCWRP study, the sediments near the canneries and Newport Plating, a defunct metals plating facility, continued to have elevated concentrations of cadmium (Cd), Cu, Pb, tin, polyaromatic hydrocarbons (PAHs), and PCBs, indicating that they are the likely sources of much of the contamination in the upper Rhine Channel. Board Compliance staff is assisting the TMDL development by working with owners of the Newport Plating facility site to submit a remediation plan. Runoff and process wastewater from boatyards, restaurants, and urban runoff from Newport Beach and Lido Peninsula are the apparent current sources of pollution to the Channel. Board staff has also noted a correlation between the PCBs congeners measured in fish caught in Lower Newport Bay to those found in the Rhine Channel sediments. Staff suspects that the contaminated sediments in the Channel are likely linked to PCB levels in fish caught in the Lower Bay.

Board staff will recommend to the Regional Board that the Rhine Channel TMDL Implementation Plan (IP) include a phased implementation scheme. The IP will identify some potential sources of funding to clean up the sediments in the Channel and a remediation schedule. If the contaminated sediments are to be removed, appropriate disposal sites will have to be evaluated. A long-term monitoring program will assess the potential for temporary adverse impacts to benthic species in Lower Newport Bay, particularly if contaminated sediment is removed, and evaluate the long-term effects of the remediation steps implemented.

Metals TMDL

The metals technical TMDL that USEPA promulgated for Newport Bay and San Diego Creek focused on the heavy metals cadmium (Cd), copper (Cu), lead (Pb), and zinc (Zn). The technical TMDL evaluated the effects of increased sediment metals concentrations on aquatic species, wildlife, plants, and human health. The TMDL concluded that concentrations of metals in LNB sediment samples exhibit acute toxicity. Cd, Cu, Pb, and Zn may bioaccumulate in benthic organisms, but generally biomagnification through the food chain does not occur.

The TMDL target specifies a 20% reduction of all freshwater metal loads to San Diego Creek. The WLAs were established as mass loads for NPDES municipal storm water discharges, urban runoff, CalTrans, and other NPDES discharges. Target mass WLAs were based on 50% reduction for CalTrans and the NPDES stormwater discharges via sediment control. The load allocations (LAs) estimate mass loads based on limited metals data collected from agricultural runoff including the nurseries, boats, air deposition, and unidentified sources. The target LAs would reduce agricultural sources by 50% using sediment controls, but do not specify a reduction from air deposition and unidentified sources. USEPA specified that Cu loads should be reduced 80% by decreasing the use of copper-based boat paints.

Because limited metals data were available to promulgate the metals TMDL, additional data are required to close several data and information gaps. The impacts associated with metal exceedences in the water column and sediment are not clearly established, such as whether toxic or other adverse effects are produced in benthic organisms and/or plants. Because heavy metals adsorb to sediments, the discharge of sediment-laden storm flows from the San Diego Creek watershed likely carries the major load of several heavy metals into

Upper and Lower Newport Bay. The metals contribution from contaminated in-Bay sediments and Lower Bay storm drains is currently unknown. Another unknown is whether sediments transported with stormwater settle into Newport Bay, or flow out to the Pacific Ocean. Volumetric data examining storm intensities should be factored into the load calculations, but these data need to be collected. The impacts of dredging in-Bay sediments on metal loading is unknown and should be examined.

Board staff has recommended in the draft toxics regional monitoring program (see below) that special studies be conducted to collect the additional information and data necessary to adequately evaluate the sources and effects of heavy metals in the watershed. For example, the major contributors of bioavailable metals within the watershed need to be explicitly identified and quantified. As stated above, current data indicate that the largest contributor of metals in the watershed is likely stormwater and urban runoff flowing into San Diego Creek and its tributaries and, ultimately, Newport Bay. Other likely sources include agricultural runoff from the upper portion of the SDC watershed and storm drains in Lower Newport Bay (NB). The link between water column metals concentrations and stormflow sediment should be investigated, as well as metal concentrations in shallow groundwater and nursery discharges. Airborne particulate matter is another potential source of metal loading in the watershed and the Bay. The Newport Bay model is based on silt-sized sediment particles. Because metals are normally associated with the clay fraction, the model should be re-run to simulate transport and deposition of metal-bound particles.

Some studies listed in the next section are contributing or will contribute new data in support of the metals TMDL. Heavy metals were assessed in the water, sediment and biota of San Joaquin Marsh and other selected areas of the San Diego Creek/Newport Bay watershed to determine accumulation effects. The Regional Board recently obtained TMDL funds that will be used to address the lack of copper data around marinas in Newport Bay. The study will investigate and quantify the leaching of copper from boat paint into marina water and sediments. The study will help determine whether Cu is flushed from marinas and/or deposited in sediments, and whether the marinas are a source of Cu and metals to other parts of Newport Bay.

Staff may propose revisions to USEPA's estimated metal target loads for Newport Bay if sufficient data are collected prior to drafting the TMDL staff report. The NB/SDC metals TMDL implementation plan will be phased to allow for additional data collection to establish that the USEPA WLAs and LAs are appropriate and to collect additional monitoring data. A focus of the metals TMDL implementation plan will be the identification and quantification of key inputs to the NB/SDC watershed in order to establish appropriate control measures that would reduce the sources of the inputs. Board staff attend meetings related to Marina issues, and the Cu boat paint Workgroup Meeting with the Department of Pesticide Regulation and other state agencies. A Technical Advisory Committee that includes local stakeholders will be developed for the metals TMDL.

Selenium TMDL

Selenium (Se) is a naturally occurring element that at extremely low concentrations is essential to animals and humans, but in excess can cause severe adverse or toxic effects. Unfortunately, the level that is crucial to health is very close to the level that causes toxicity. Se can also exhibit a toxic effect when animals take in excessive Se during the critical stages of development and growth. Selenium bioaccumulates through the food web, effecting aquatic life and wildlife, including fish and birds, and extreme effects such as congenital deformities can result in aquatic birds. The amount of Se that can produce a toxic effect is dependent on each animal species, the chemical form of Se being ingested, and the dose, duration, and timing of exposure.

The USEPA technical TMDL for selenium established WLAs, LAs, and numeric water column targets based on the CTR and National Toxics Rule criteria. For freshwater, the WLAs and LAs were tied to flow tiers in San Diego Creek. The technical TMDL also indicated areas of uncertainty that Board staff hope to address through current studies or proposed Regional Monitoring Program monitoring tasks. Understanding the sources of Se pollution, and the relationship between pollutant loads and environmental effects in the watershed, were other components of the technical TMDL requiring additional investigation. Recently

collected data will likely enable Board staff to recommend refinement of the USEPA technical TMDL WLAs and LAs.

Board staff initiated several contracts to collect biological data to aid in generating site-specific Se bioaccumulation data, which in turn is expected to assist in developing tissue targets to protect wildlife in the watershed. The studies include watershed specific biological assessments of the impacts of Se on local species of fish and birds. The bioaccumulation data may lead to developing bioaccumulation factors for sensitive bird species that could result in recommendations to adjust the USEPA Se numeric targets and WLA/LAs to more accurately reflect the conditions in the watershed. One study obtained tissue data from American avocet and blackneck stilt eggs collected in Upper Newport Bay and San Diego Creek. The egg tissue concentrations exceeded 10 mg Se/kg dry weight, which may indicate an exceedance of the ecological risk guideline for Se, but the data are being reviewed to insure the laboratory properly analyzed the data. Some of the data will help staff develop a biological monitoring program as part of the toxics regional monitoring program to evaluate Se and organochlorine compounds in the watershed, and to create a conceptual model of contaminant pathways in birds in the watershed. Details of the various investigations now underway are listed in the next section of the report.

Watershed studies are either underway or completed to investigate the sources of Se in the water column. Elevated Se concentrations have been found to be associated with alkali soils and shallow groundwater zones in the SDC/NB watershed, particularly in the area of a historic swamp, La Cienega de las Ranas (Swamp of the Frogs). In some locations, shallow groundwater is a significant and constant source of selenium into surface water. Data affirm that the concentrations of dissolved Se found in SDC at Campus Drive and in tributaries to SDC consistently exceed the California Toxics Rule (CTR) chronic criterion of 5 µg/L for freshwater, and that the acute criterion is also sometimes exceeded. Dissolved Se concentrations in Newport Bay have not been found to exceed the CTR salt water criterion of 71 µg/L. The water column criterion for Se is generally the standard measure to establish that sensitive wildlife beneficial uses are protected. However, the US Fish and Wildlife Service (USFWS) and the US National Oceanic and Atmospheric Administration issued a Biological Opinion on March 24, 2000 that stated that the CTR chronic criterion of 5 µg/L did not sufficiently protect sensitive threatened and endangered species (T&E species). Pursuant to the Biological Opinion, USEPA is currently working with the US Geological Service and USFWS to develop a site-specific criterion for California that will ensure T&E species protection.

As part of consideration of the recently adopted General Permit for Short-Term Groundwater Related and De Minimis Discharges in the San Diego Creek / Newport Bay watershed (Order No. R8-2004-0021, NPDES No. CAG998002), a number of dischargers in the watershed have formed a Working Group and are in the process of developing a workplan designed, in part, to identify and quantify sources of selenium to surface waters and to develop groundwater management plans on a watershed scale for both selenium and nitrogen. Board staff are active participants in the Working Group effort. Workplan tasks will include evaluation and demonstration of potential Se remediation technologies and techniques. It is expected that this work will be integrated with and complement completed studies (see below) and ongoing work by Board staff to refine the USEPA Se technical TMDL and to develop an appropriate implementation plan. Given the complex chemical nature of Se and its transformation in the environment, Board staff may recommend the development of a site-specific Se objective. The Working Group has committed to complete the work needed to develop such an objective, if it appears necessary and appropriate to do so.

The complexity of understanding Se sources and controls linked to wildlife impacts and Se cycling in the SDC/NB watershed will require a phased Se TMDL implementation plan (IP). The phased implementation plan will allow for the continued investigation of sources and impacts Board staff established a Se Technical Review Committee (STRC) to provide technical assistance in the development and review of studies, and in the development of an appropriate implementation plan.

San Diego Creek/Newport Bay Studies

The development of the toxics TMDLs are being supported with a total of \$1,187,212 in State funds as of August 2004. Most of the studies listed below are currently ongoing, but the top three have been completed. It is important to emphasize that Board staff does not expect that all of these studies will be completed prior to the development of proposed amendments to incorporate the USEPA technical TMDLs and implementation plans into the Basin Plan. In order to meet commitments to the USEPA to complete this process within the schedules identified at the outset of this report, it will be necessary to recommend phased TMDLs and implementation plans that reflect the best scientific data then available. It is fully recognized that these TMDLs/implementation plans will need to be revisited and possibly revised as new data and analyses provided by these or other studies become available. Again, the proposed TMDLs may differ from those promulgated by the USEPA, if the best scientific data available to Board staff demonstrates that revisions are appropriate.

UCR/CSULA Study of Sources of Se, As, and N in the SDC/NB Watershed

The study was conducted to determine the sources and mechanisms whereby selenium (Se), as well as arsenic (As) and nitrates, are entering the SDC/NB watershed. The researchers determined that groundwater is the primary source of Se, As, and a large portion of the nitrates found in San Diego Creek, and also contributes approximately 95% of the Se entering into Newport Bay. Up to eighty-five percent of San Diego Creek base flows are comprised of groundwater from the underlying shallow aquifer. Groundwater inputs to surface waters in the watershed include those from springs, seeps, leaky storm drains, and groundwater-related discharges (dewatering, well testing, etc.) Se concentrations are reduced by approximately 40% when measured from the upper part of the SDC watershed near Tustin MCAS to below San Joaquin Marsh. The reduction may be due to volatilization by plants, sequestration in sediments, and/or biological uptake. Completed study.

Alex Horne Associates Study of Se in Biota in Two Locations in San Diego Creek

A one-time sampling program was conducted at two locations in the San Diego Creek watershed, Santa Fe Channel (SFC) at Edinger and Peters Canyon Wash (PCW) below the confluence with the Como Channel, to characterize Se uptake in biota in areas where higher concentrations of Se enter San Diego Creek. The water column and biota samples collected from PCW were much higher compared to those collected from SFC. The chironomid larvae from PCW contained a higher average concentration of Se 46.8 mg/kg, versus the mosquito fish composite from PCW at 29.9 mg/kg. The study concluded that Se is accumulating in the organisms at a level of risk to birds and wildlife that feed on them. Therefore, locations in the watershed that receive water from SDC should be assessed for potential risks to avian wildlife. Completed study.

SCCWRP Study of the Bioaccumulation of Contaminants in Recreational and Forage Fish in Newport Bay, California, 2000-2002

This study established that DDT, PCBs, and Se continue to bioaccumulate in recreational and forage fish in Newport Bay. DDT was found in all fish samples, but PCBs were exceeded only in fish caught from Lower Newport Bay. Se was found only in three fish that were collected from a section of Upper Newport Bay where SDC inflows are the highest. Completed study.

UCB Study of Se and Heavy Metals in Water, Sediment and Biota in the San Joaquin Marsh

The study will assess the accumulation of selenium and heavy metals in the biota and sediment of San Joaquin Marsh and other selected areas in the San Diego Creek/Newport Bay watershed. The final report is expected December 2005.

SCCWRP Clapper Rail/UNB Food Web Study

The study will evaluate the potential impacts of trace metals and bioaccumulative toxins such as the organochlorine compounds and Se, on the light-footed clapper rail, a federally protected species. The final report is due May 2005.

CSULA Study of Comparison of Multiple Methods for Removal of Selenium in the San Diego Creek and Upper Newport Bay Watersheds

Selenium cycling in the SDC/NB watershed and potential scenarios to remove selenium from surface and ground water are expected to be investigated. A groundwater-surface water model will be developed to model groundwater management scenarios for selenium in the watershed. The final report is due March 2007.

SCCWRP Investigation of bioaccumulative contaminant concentration in bird eggs, food items and sediment in the San Diego Creek/Newport Bay Watershed

Selenium (Se) and organochlorine compounds (OCs) will be evaluated for their bioaccumulation potential in birds and associated food items. The data will be used to develop a biological monitoring program in support of the Se and OCs TMDLs. A conceptual model of contaminant pathways in birds in the watershed will be created. The current funding will support analysis of bird eggs for Se. Additional funds have been requested for the analysis of eggs for the OCs, and sediment and food items for Se and OCs. The final report is expected March 2007.

SCCWRP/UCR/CSULB Assessment of food web transfer of organochlorine compounds, selenium and trace metals in fishes in Newport Bay, California

The project will evaluate several trophic pathways by which the organochlorines, selenium, and some metals accumulate in the biota. Key fish species will be collected and their stomach contents will be identified to determine if they feed in Newport Bay. The fish and their food will be analyzed for OCs, trace metals, and Se contamination. The concentrations of toxics in the fish tissue will be compared against predator-risk guidelines and human health guidelines. The final report is due March 2007.

SCCWRP Analysis of Sediment and Biota Collected from SDC Basin No. 2

Archived samples of sediment, bivalves and fish collected from SDC in-channel basin No. 2 by Board staff in June 2003 will be analyzed. The final report is expected now.

IRWD Se Removal Demonstration Project

IRWD proposes to construct in the field a demonstration-scale subsurface system of biofilters. Based on the results of their pilot-scale tests, the system may reduce Se in water to 5 ppb or less. This study has not started yet.

Regional Monitoring Program for Toxics

A Regional Monitoring Program (RMP) for toxic constituents is being proposed for the San Diego Creek/Newport Bay watershed. The program will provide a framework by which water column, sediment, and biological tissue data are collected for different purposes to minimize duplication and maximize cost-efficiency. Because the data and information would be funneled through one program, a comprehensive database can be easily maintained, and evaluating data for long-term trends would become practical. The program, if implemented cooperatively, can be achieved effectively with less cost to the State and dischargers than several independent programs operating concurrently.

The primary focus of the draft proposed toxics RMP is to obtain the water quality data necessary to develop specific components of the toxics TMDLs and also aid in specifying required activities in the toxics TMDLs implementation plans. During the promulgation of the Newport toxics technical TMDLs, the USEPA recommended that the Regional Board develop a coordinated monitoring program that would more fully characterize toxic pollutant trends and help demonstrate the effectiveness of pollutant control strategies throughout the entire Newport Bay watershed. The monitoring data are critical to develop comprehensive and realistic Newport Bay toxics TMDLs, as well as to assess compliance with the TMDL implementation plans. Staff anticipates that this comprehensive monitoring approach will eventually incorporate most or all current monitoring programs, including individual waste discharge compliance monitoring and collective programs, such as the Orange County Municipal Stormwater permit monitoring program. In fact, some RMP components would readily streamline into the Orange County stormwater program by utilizing the same sampling locations and comparable analytical methodologies.

Board staff will finalize the toxics RMP so that the monitoring program can be underway by this spring. The RMP will be mailed to every individual waste discharger in the SDC/NB watershed, as well as to Orange County as the lead permittee under the Orange County Stormwater Permit monitoring program. Each discharger may decide whether to participate in the RMP individually or collectively. The proposed RMP specifies that the data will be collected under a freshwater and a saltwater component, and includes a separate special monitoring component.

FRESHWATER MONITORING

Locations	Constituents
Aqua Chinon Channel Central Irvine Channel El Modeno Irvine Channel Lane Channel Bonita Canyon Costa Mesa Channel Peters Canyon Wash San Diego Creek-Harvard Santa Ana Delhi Channel San Diego Creek-Campus	Organophosphates Organochlorines/PCBs Toxicity Metals Selenium

The freshwater component identifies certain toxic constituents to be monitored seasonally, and in some cases, the collection and analyses of both water column and sediment samples is required. Paired metals data are necessary, i.e., both total and dissolved. Specific sampling protocols will need to be followed in order to insure the data will be comparable to the California Toxics Rule criteria.

SALTWATER MONITORING

Locations	Constituents
UNB San Diego Creek Unit 2 Basin NB Jamboree Unit 1 Basin UNB North Star Beach UNB Coast Highway Bridge LNB Harbor Island Reach <i>UNB Big Canyon Wash</i> <i>LNB Turning Basin</i> <i>LNB btwn Lido Island & Balboa Island</i> <i>LNB SE of Balboa Island</i>	Organophosphates Organochlorines/PCBs Toxicity Metals Selenium

UNB=Upper Newport Bay LNB=Lower Newport Bay

The Newport Bay component includes fewer monitoring stations overall, except for metals, which requires the last four stations listed on the table in italics to be sampled in addition to the others. Much less existing data are available to establish the sources of metals, particularly in Lower Newport Bay, and to quantify the loading from these sources.

SPECIAL MONITORING NEEDS

Need	Purpose
Algal monitoring	TMDL implementation: monthly in-season, bi-monthly off-season
Dissolved oxygen	TMDL implementation: mid-column and bottom
Benthic biota	TMDL development/implementation: bivalves, worms, insects, insect larvae, salt marsh snails, amphipods, isopods, crabs where present.
Fish tissue	TMDL development/implementation: sample available resident species, both sport and prey varieties, esp. California killi fish, spotted sand bass, juvenile halibut, topsmelt, striped mullet, arrow gobies, etc. in UNB
Egg tissue and teratogenesis	TMDL development/implementation: Non-T&E surrogate species for Light-footed clapper rail, Brown Pelican, Least Tern, Osprey, Least Bell's Vireo, Savannah Sparrow, California Gnat Catcher. Sampling stations may change seasonally with nesting locations of target species.
Metals TMDL only	
Sediment/contaminant link in stormwater samples	Evaluate metals loadings carried by stormwater sediments.
In-Bay sediment monitoring	Identify stormwater loads into NB versus the in-Bay sediments remaining after storms.
Cu monitoring of LNB	Evaluate Cu boat paint leaching into marina waters.
Cd monitoring in SDC, other FW channels	As Cd chronic CTR will change to 0.64 ug/L, labs must analyze at lower detection limit.
LNB storm drain monitoring	Current storm drain inputs to LNB.
Metal hotspots toxicity studies	

The special monitoring component provides for algae, benthos, and tissue samples to be obtained in order to assess what toxics are entering through the food chain in the watershed. Currently, there are insufficient data for the organochlorines and metals. The sample results will provide trend data on toxic concentrations in key fish and bird species. The data can also aid in evaluating bioaccumulation or bioconcentration effects. Although the RMP would require intensive sampling, the duration of the special monitoring is limited, for most constituents. The data available to evaluate the metals TMDL WLAs, LAs, and linkage and impact analysis are very limited.

The organochlorine compounds, some heavy metals, and selenium in certain chemical forms, are associated with sediments in the watershed. As discussed under the organochlorine, selenium, and metals TMDLs, data are needed to better understand the linkages between adsorbed contaminants and sediment particulates, i.e., the sediment-contaminant link. Also, the bioavailability of some organochlorine compounds differs when adsorbed to sediments versus dissolved or suspended in the water column. Board staff believe it is appropriate to review the sediment TMDL implementation plan concurrent to, or immediately after, the development and adoption of the toxics TMDLs implementation plans. The sediment TMDL implementation plan monitoring program should be modified to collect bound contaminants concentrations, to enable staff to evaluate impacts to biological species. The biological impact analysis will be accomplished in part through the organochlorine and metals TMDLs' biological endpoints analyses.

A review of the sediment TMDL is currently underway to determine, in part, whether the goal of 50% reduction in sediment loading to the Bay is being achieved, and if achievement of the goal will be sufficient to reduce OC concentrations coming into the Bay from upstream resources. The estimated load reductions in the sediment TMDL were based on modeling of silt-sized particle transport. Organochlorine compounds and

some heavy metals absorb to the finest soil particles, including clays and organic materials. Staff has recommended that a special study be conducted as part of the toxics RMP to estimate the amount of toxic pollutants attached to clay particles flowing from San Diego Creek into Newport Bay. The investigations would determine whether the existing load calculations are correct and will result in a net reduction in OCs and some metals entering the Bay. The results will provide data on the efficacy of upstream BMPs in reducing the amount of fines that enter SDC and NB.